Geology of Egypt

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The three layers

A layer of limestone covers most of the surface of modern Egypt.

Beneath this lies a bed of sandstone, and this earlier sandstone is the surface rock in Nubia and southern Upper Egypt, as far north as the area between Edfu and Luxor.

The oldest ground of modern Egypt comprises outcrops of metamorphic and igneous rocks.

River and rock

The Nile River cuts its way north from Sudan; through the sandstone the Valley is narrow, with few fields either side in Lower Nubia and southern Upper Egypt, whereas the limestone Valley in Egypt between Luxor and the Fayum is broader, widening in Middle Egypt with a parallel river branch between Asyut and the Fayum. Between the Fayum and the Delta, the Valley is narrower again, before the river splits into separate branches, forming a great flat Delta between Cairo and the Mediterranean Sea.

The classification of rocks

Rocks are classified into three main groups, according to the conditions of their formation:

1. igneous (also called eruptive or magmatic rocks: the solidifed form of magma, the molten material beneath the surface or 'crust' of planet earth)
2. sedimentary rocks (products of decomposition deposited by water, ice or wind)
3. metamorphic rocks (result of transfromation of sedimentary or igneous rocks under high pressures and high temperatres)

The first two of these general groups can be subdivided further:

Group 1. igneous rocks are divided according to their position at formation:

- plutonic (or intrusive) rocks - the magma solidified below the surface of the earth
- volcanic (or extrusive) rocks - the magma poured out at a volcanic eruption, and solidified above ground
- veinstones - the magma penetrated cracks in adjacent rocks, and solidified there

Group 2. sedimentary rocks are divided according to the material out of which they were formed:

- clastic sediments - loose weathered particles such as gravel (broken stone) and sand: in conglomerate rocks, these loose particles are bound by clay, lime or quartz
- chemical sediments - from materials dissolved in water
- organic sediments - from accumulations of dead animals or plants

See illustrations of these in the page on stone.

The harvest of the desert

At all periods the Egyptians made full use of their soft stones, the limestone and sandstone cliffs along the Valley, for building stone: in general, they used a relatively close source, and so the monuments from Abydos to Cairo are mainly of limestone, and those from Dendera south are mainly of sandstone. In addition, they quarried the harder rocks in the outcrops north of Cairo (quartzite), at the First Cataract (granite and granodiorite), and north of the Fayum (basalt).

The Saharan deserts to west and east of the Nile Valley in Egypt and Nubia offer a variety of other stones: well-used quarries include the calcite/travertine quarries at Hatnub, south-east of Amarna, and the quarries for sedimentary stones along the Wadi Hammamat, between Koptos and the Red Sea. The Roman Emperors set up more distant quarries, most famously at the source for imperial porphyry.

The desert also provided semi-precious stones such as amethyst, carnelian and jasper.

At several quarries, the ancient mining expeditions left inscriptions immortalising their success.

References

- Arnold 1991